

FIG. 1

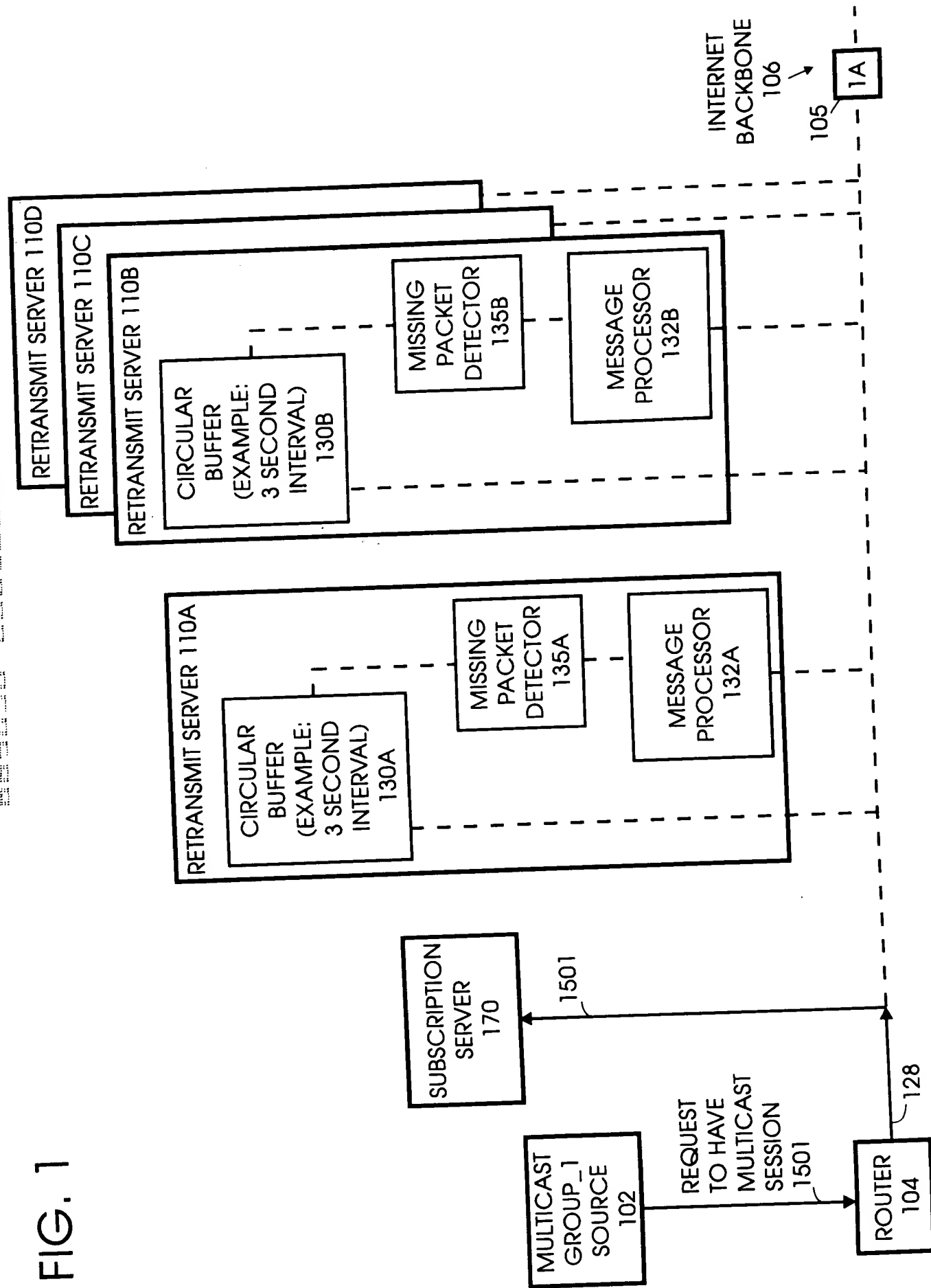


FIG. 1A

65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

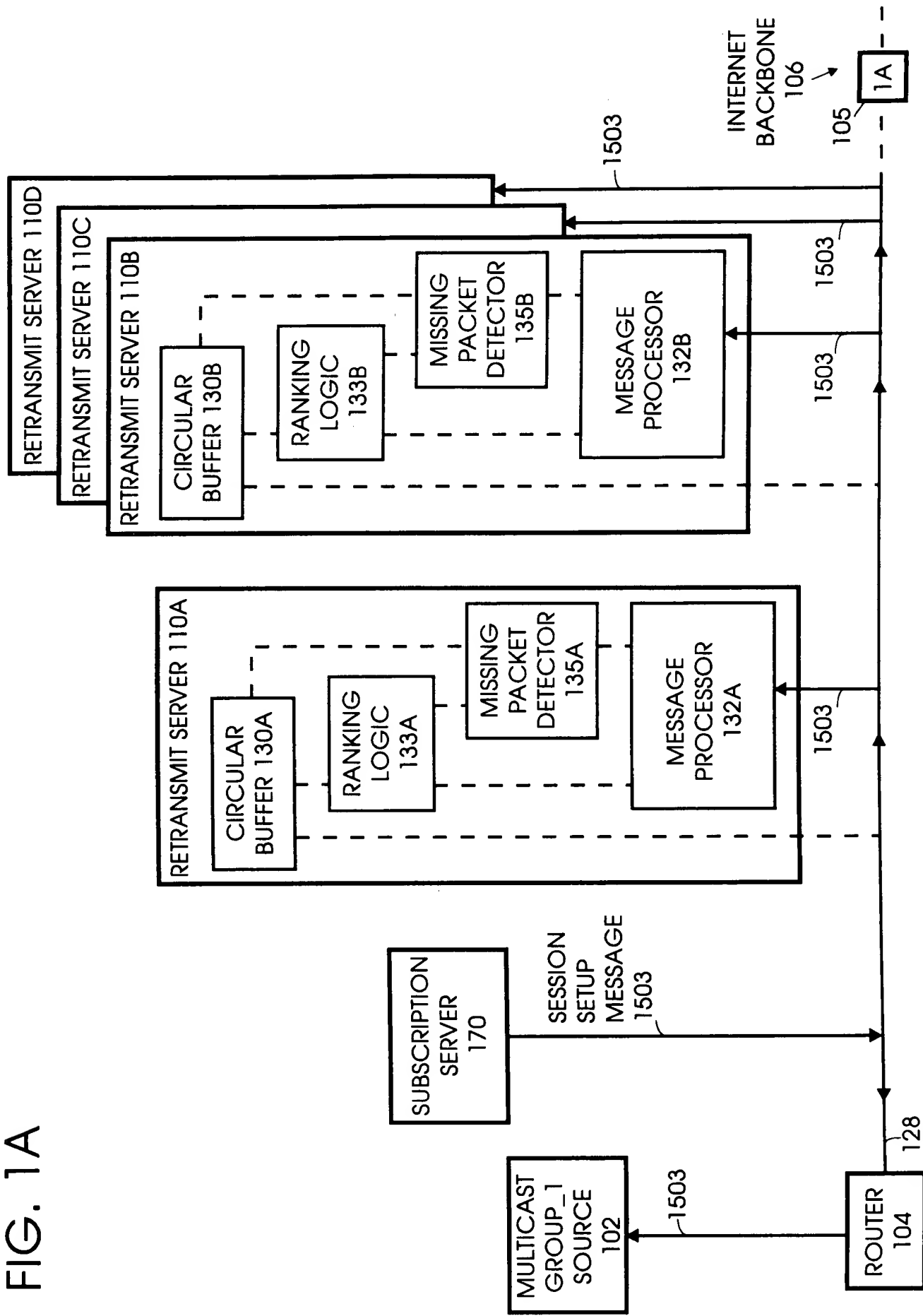
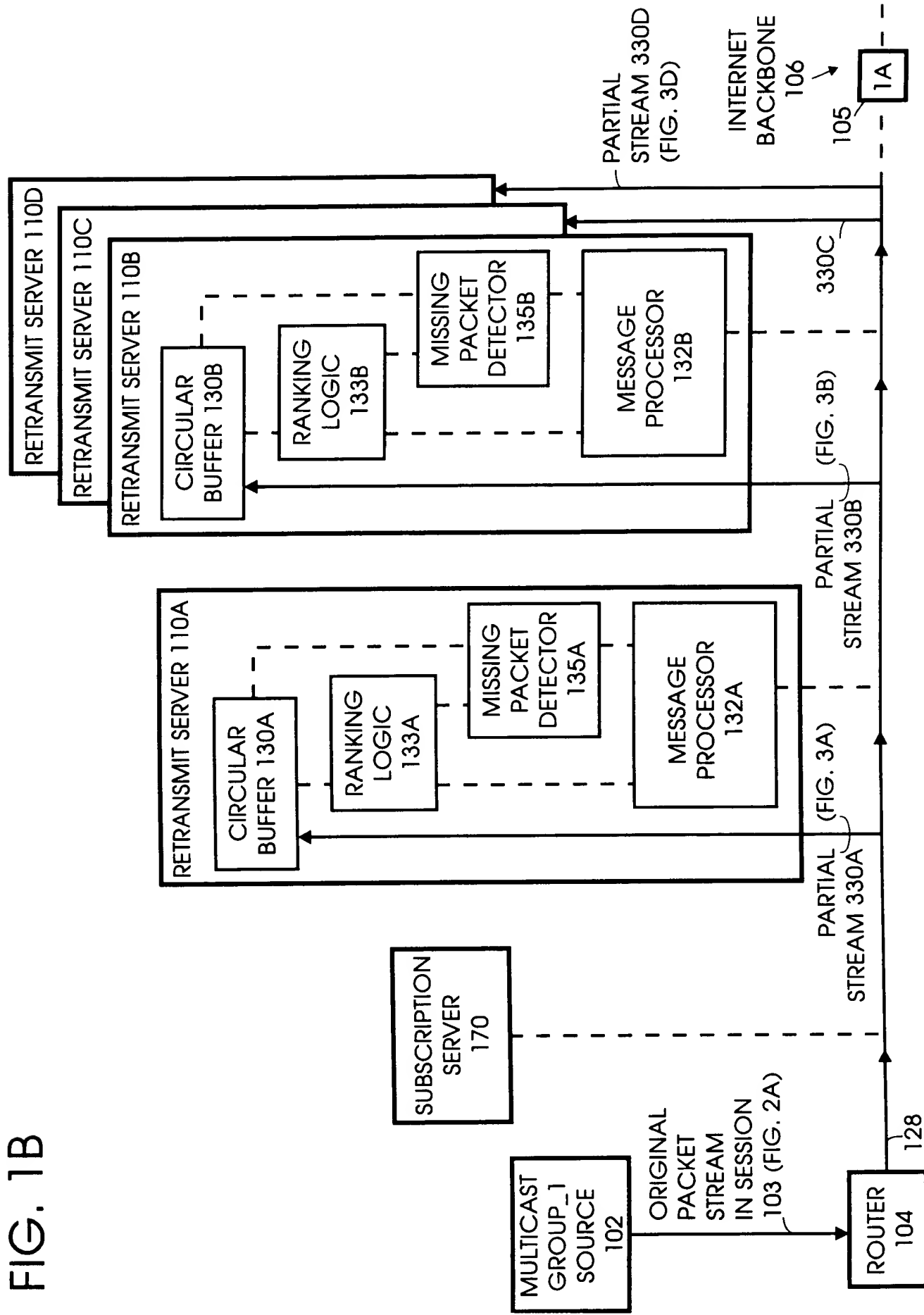


FIG. 1B



	1987	1986	1985	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911	1910	1909	1908	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	1889	1888	1887	1886	1885	1884	1883	1882	1881	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866	1865	1864	1863	1862	1861	1860	1859	1858	1857	1856	1855	1854	1853	1852	1851	1850	1849	1848	1847	1846	1845	1844	1843	1842	1841	1840	1839	1838	1837	1836	1835	1834	1833	1832	1831	1830	1829	1828	1827	1826	1825	1824	1823	1822	1821	1820	1819	1818	1817	1816	1815	1814	1813	1812	1811	1810	1809	1808	1807	1806	1805	1804	1803	1802	1801	1800	1799	1798	1797	1796	1795	1794	1793	1792	1791	1790	1789	1788	1787	1786	1785	1784	1783	1782	1781	1780	1779	1778	1777	1776	1775	1774	1773	1772	1771	1770	1769	1768	1767	1766	1765	1764	1763	1762	1761	1760	1759	1758	1757	1756	1755	1754	1753	1752	1751	1750	1749	1748	1747	1746	1745	1744	1743	1742	1741	1740	1739	1738	1737	1736	1735	1734	1733	1732	1731	1730	1729	1728	1727	1726	1725	1724	1723	1722	1721	1720	1719	1718	1717	1716	1715	1714	1713	1712	1711	1710	1709	1708	1707	1706	1705	1704	1703	1702	1701	1700	1699	1698	1697	1696	1695	1694	1693	1692	1691	1690	1689	1688	1687	1686	1685	1684	1683	1682	1681	1680	1679	1678	1677	1676	1675	1674	1673	1672	1671	1670	1669	1668	1667	1666	1665	1664	1663	1662	1661	1660	1659	1658	1657	1656	1655	1654	1653	1652	1651	1650	1649	1648	1647	1646	1645	1644	1643	1642	1641	1640	1639	1638	1637	1636	1635	1634	1633	1632	1631	1630	1629	1628	1627	1626	1625	1624	1623	1622	1621	1620	1619	1618	1617	1616	1615	1614	1613	1612	1611	1610	1609	1608	1607	1606	1605	1604	1603	1602	1601	1600	1599	1598	1597	1596	1595	1594	1593	1592	1591	1590	1589	1588	1587	1586	1585	1584	1583	1582	1581	1580	1579	1578	1577	1576	1575	1574	1573	1572	1571	1570	1569	1568	1567	1566	1565	1564	1563	1562	1561	1560	1559	1558	1557	1556	1555	1554	1553	1552	1551	1550	1549	1548	1547	1546	1545	1544	1543	1542	1541	1540	1539	1538	1537	1536	1535	1
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FIG. 1D

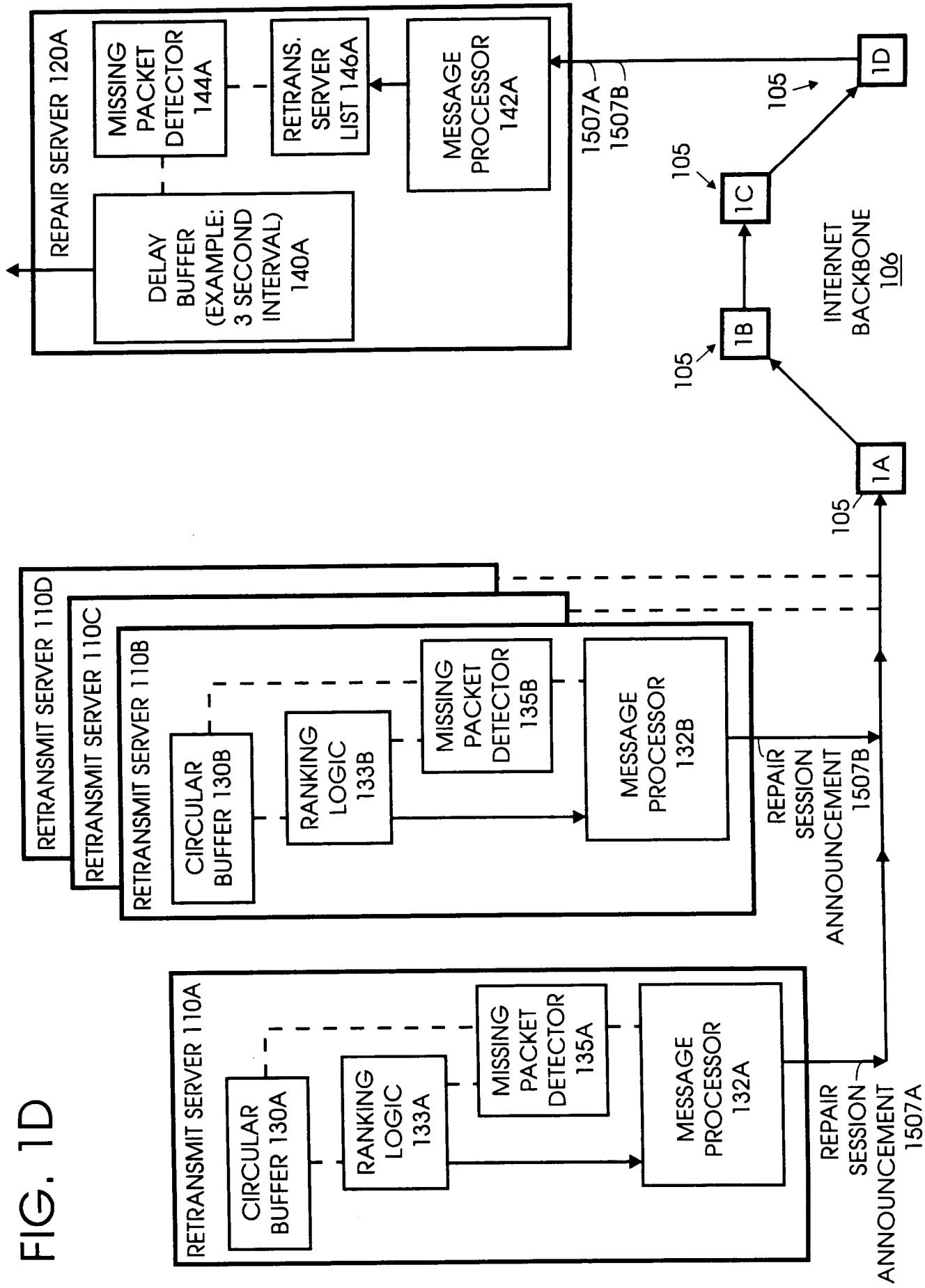
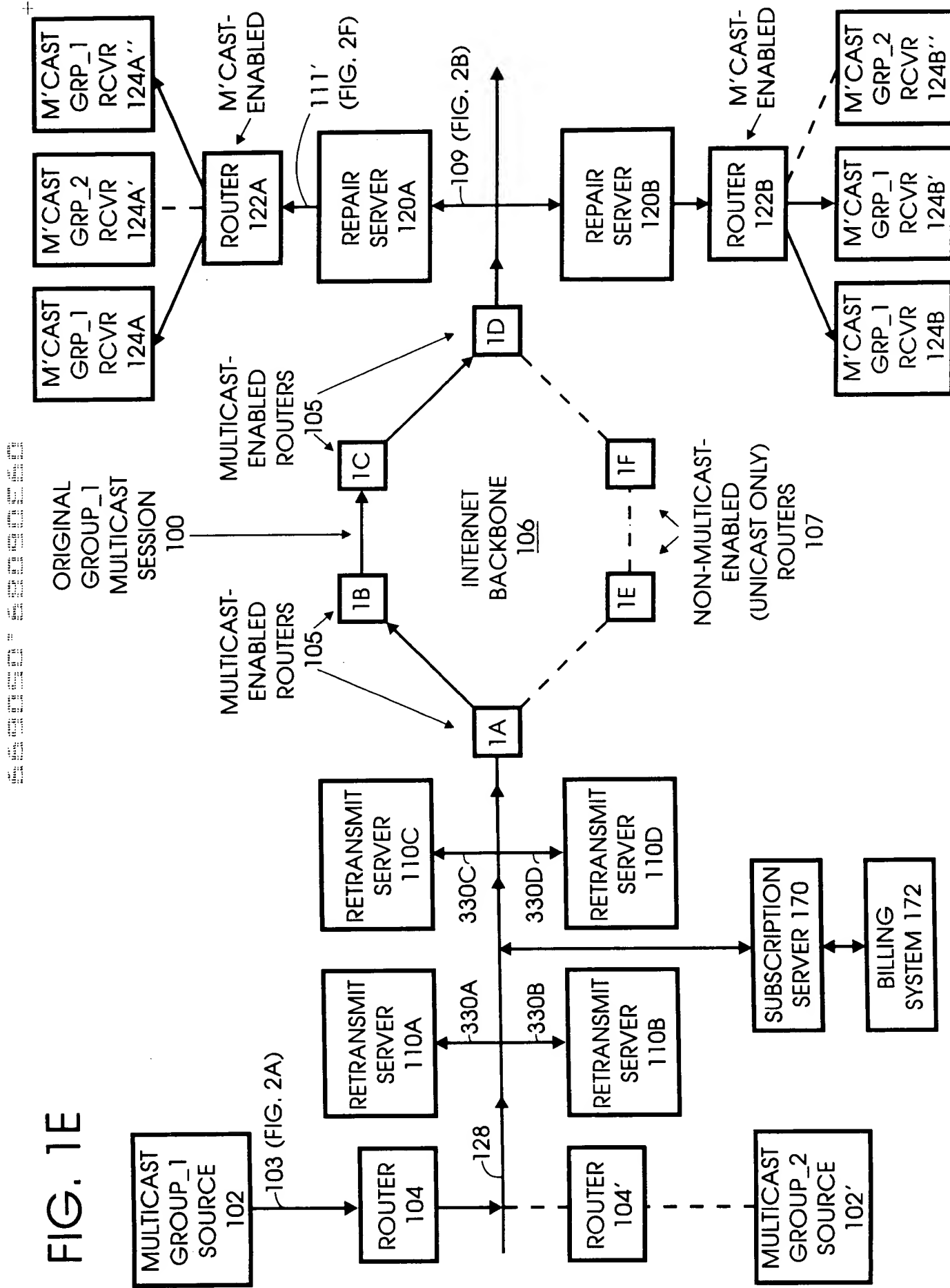


FIG. 1E



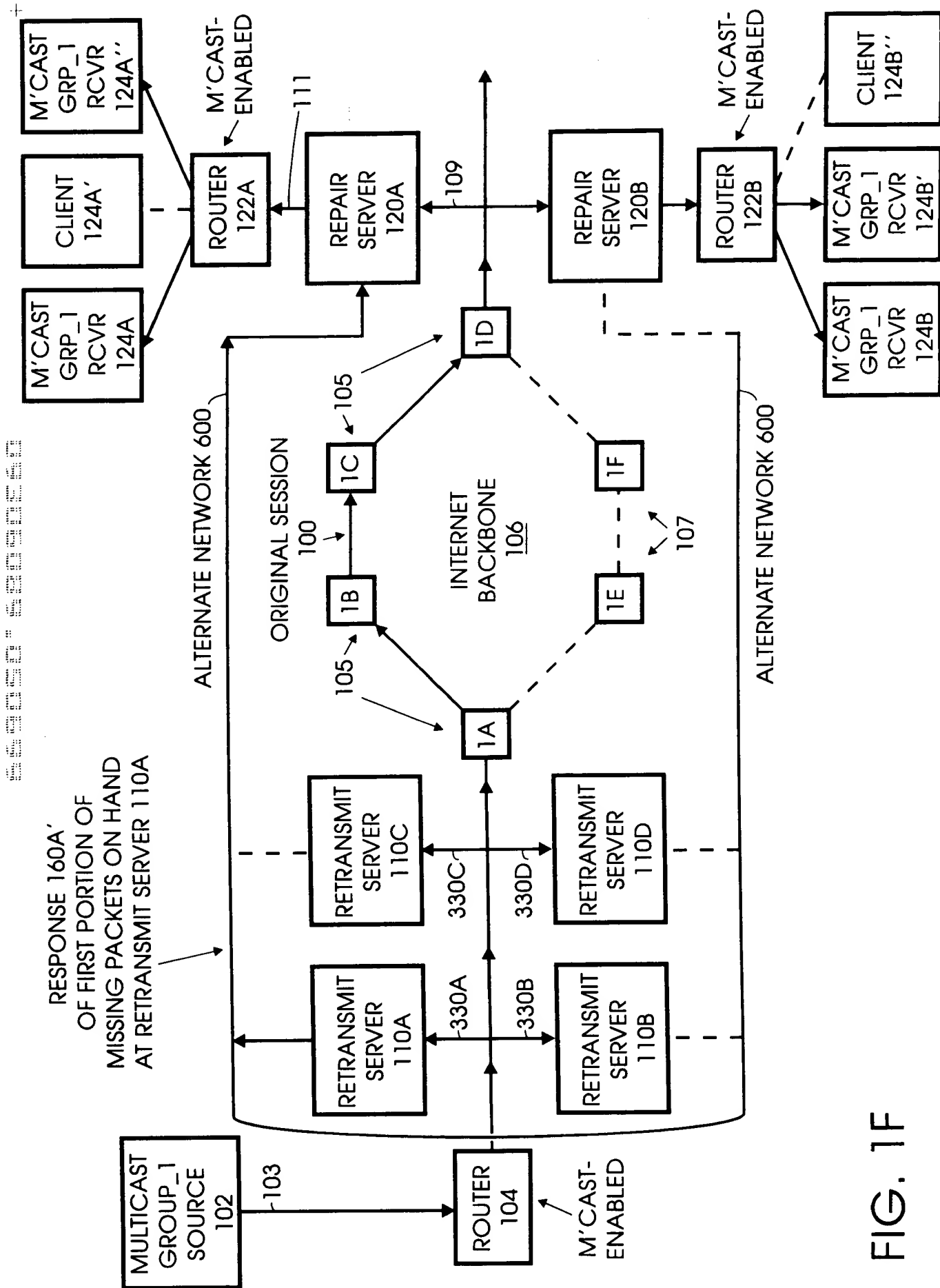


FIG. 1F

FIG. 2

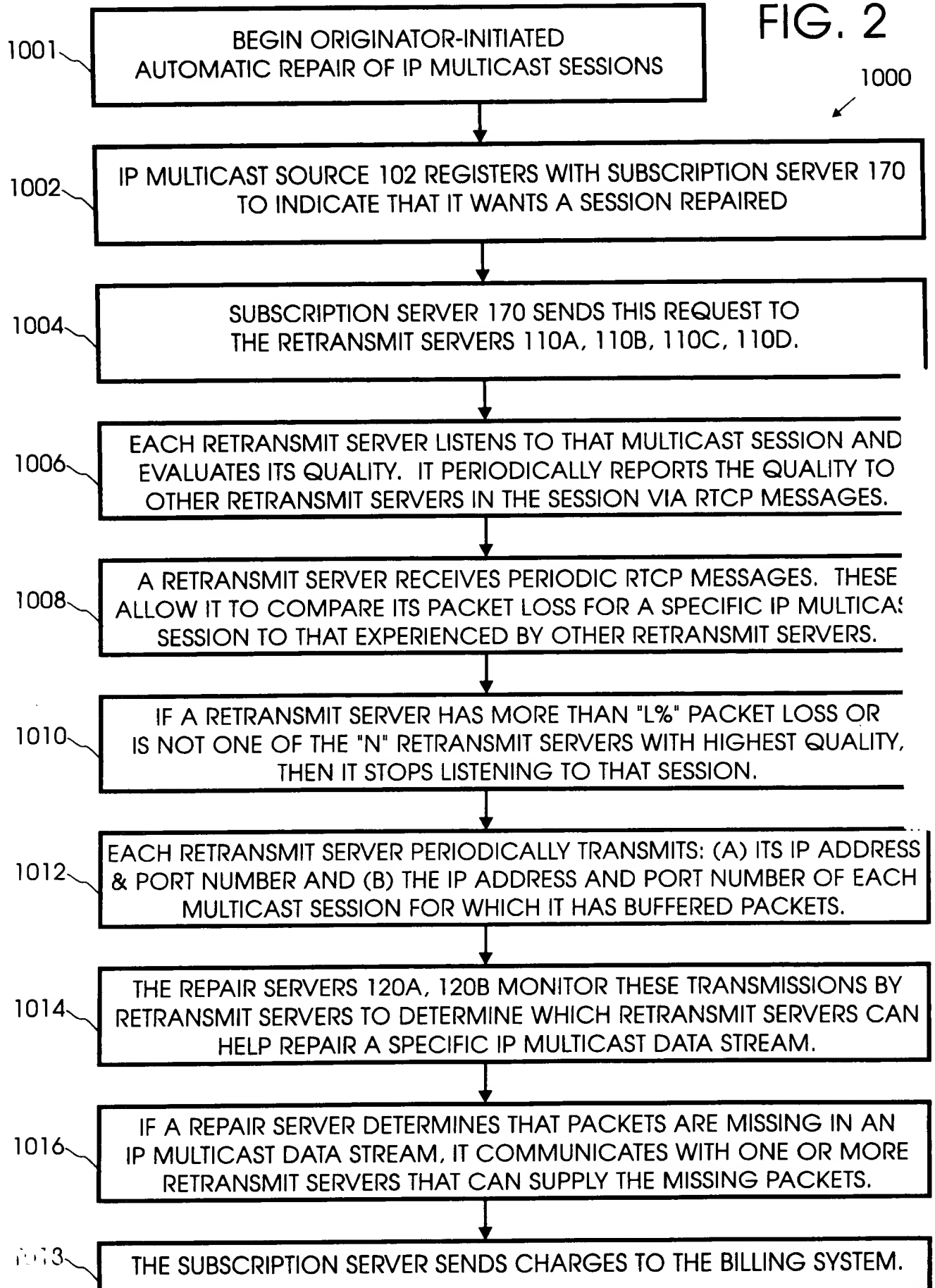
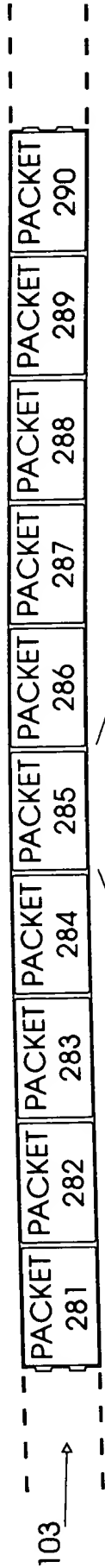




FIG. 2A

PACKETS CURRENTLY BEING OUTPUT BY  
MULTICAST GROUP\_1 SOURCE 102



IP HEADER				UDP HEADER			RTP MESSAGE		
00	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	IP OPTIONS	SOURCE PORT	DEST. PORT	00	SEQUENCE NUMBER 285	TIME STAMP 090235	DATA
	RETRANS. SERVER 110A	MULTICAST GROUP_1 ADDRESS		CIRC. BUFFER 130A	DELAY BUFFER 140A				

PACKET 285

FIG. 2B



PACKETS CURRENTLY BEING DELIVERED TO DELAY BUFFER 140A

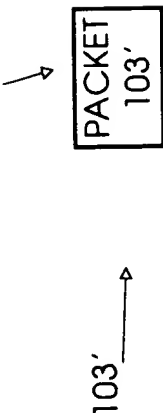
FIG. 2C



PACKETS CURRENTLY BEING DELIVERED TO ROUTER 122A  
WITH A 3-SECOND DELAY

FIG. 2D

RTCP SOURCE DESCRIPTION PACKET PERIODICALLY OUTPUT BY  
MULTICAST GROUP\_1 SOURCE 102

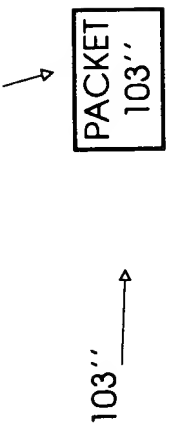


IP HEADER			UDP HEADER		RTCP SOURCE DESCRIPTION			
o o	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	SOURCE PORT	DEST. PORT	CNAME	TOOL	NOTE	
	RETRANS. SERVER ADDRESS 110A	MULTICAST GROUP_1 ADDRESS						
IP OPTIONS			MSG. PROC. 132A	MSG. PROC. 142	GROUP_1 SOURCE 102	MPEG2	"VOICE TRACK IS 5 CHANNELS"	



FIG. 2E

RTCP SENDER REPORT PACKET PERIODICALLY OUTPUT BY  
MULTICAST GROUP\_1 SOURCE 102



IP HEADER			UDP HEADER		RTCP SENDER REPORT			
00	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	IP OPTIONS	SOURCE PORT	DEST. PORT	SENDER'S ID	SENDER'S PACKET COUNT	SENDER'S OCTET COUNT
	RETRANS. SERVER 110A	MULTICAST GROUP_1 ADDRESS		MSG. PROC. 132A	MSG. PROC. 142			

PACKET 103''

# FIG. 2F

REPAIRED MULTICAST SESSION 111'  
WHICH APPEARS TO RECIPIENT RECEIVERS 124A  
TO BE THE SAME MULTICAST GROUP\_1 SESSION  
FROM SOURCE 102



IP HEADER				UDP HEADER		RTP MESSAGE		
○○	SOURCE IP ADDRESS	DESTINATION IP ADDRESS	IP OPTIONS	SOURCE PORT	DEST. PORT	○○	SEQUENCE NUMBER	TIME STAMP
	REPAIR SERVER 120A	MULTICAST GROUP_1 ADDRESS		DELAY BUFFER 140A	RCVR 124			
								DATA

→  
PACKET 285

# FIG. 3

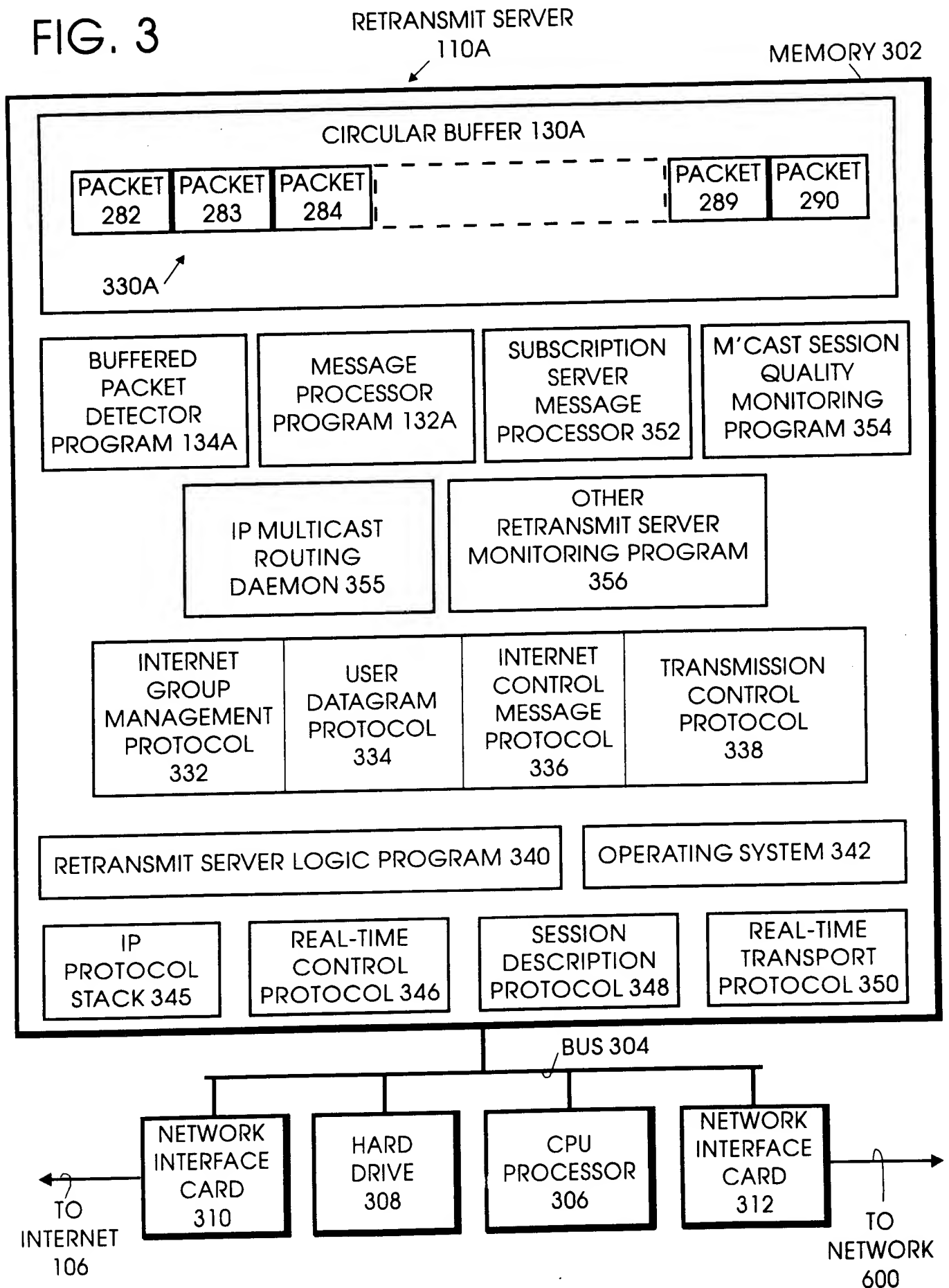


FIG. 3A

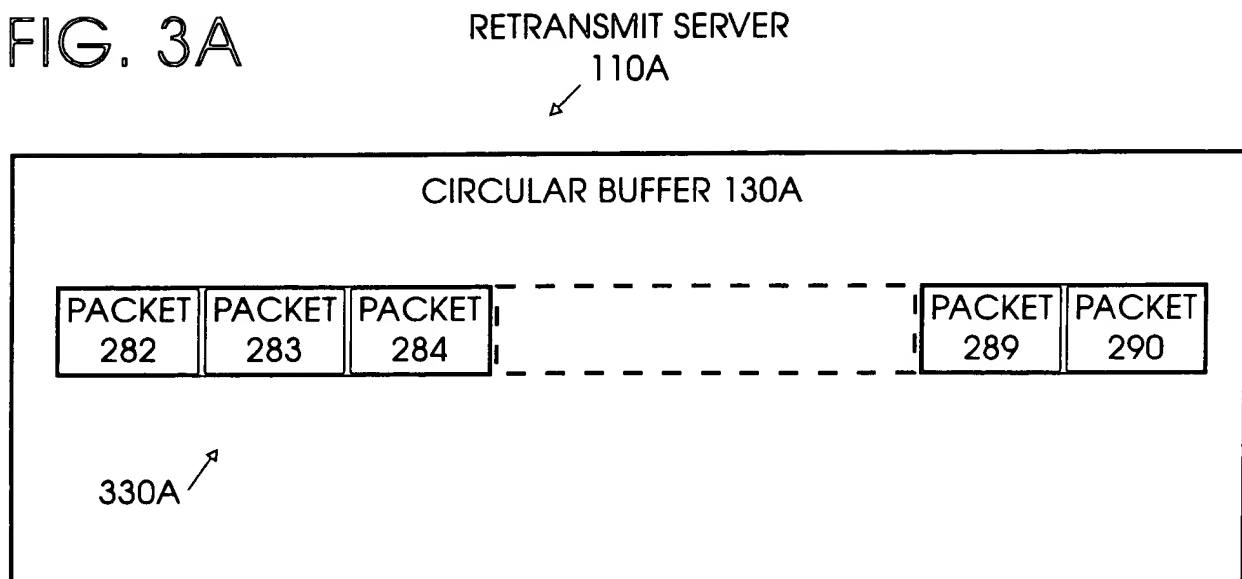


FIG. 3B

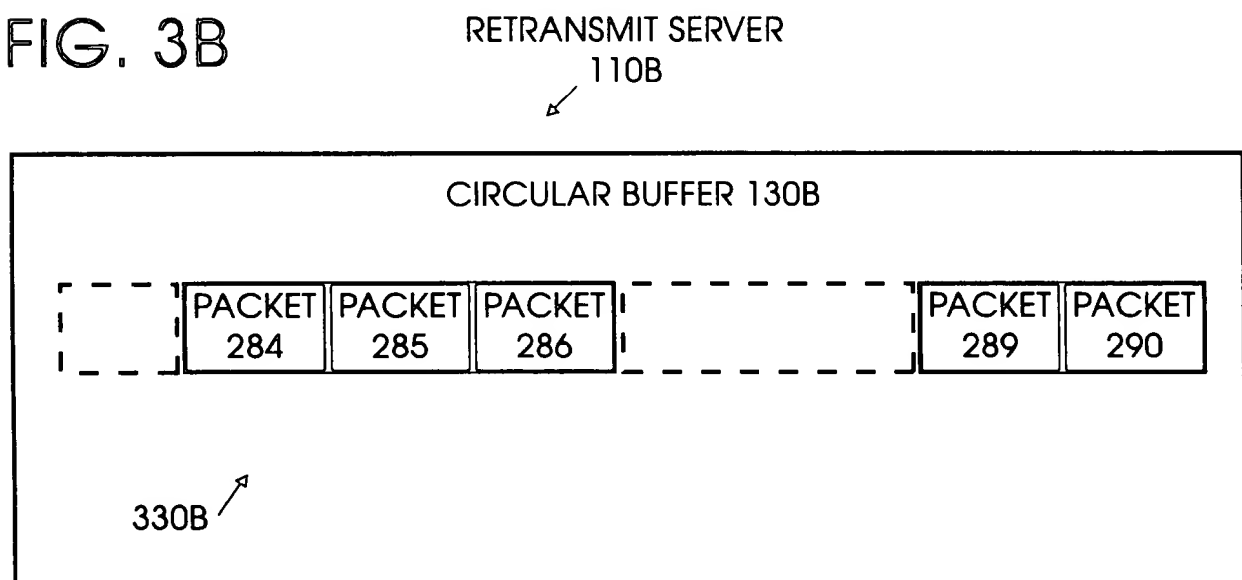


FIG. 3C

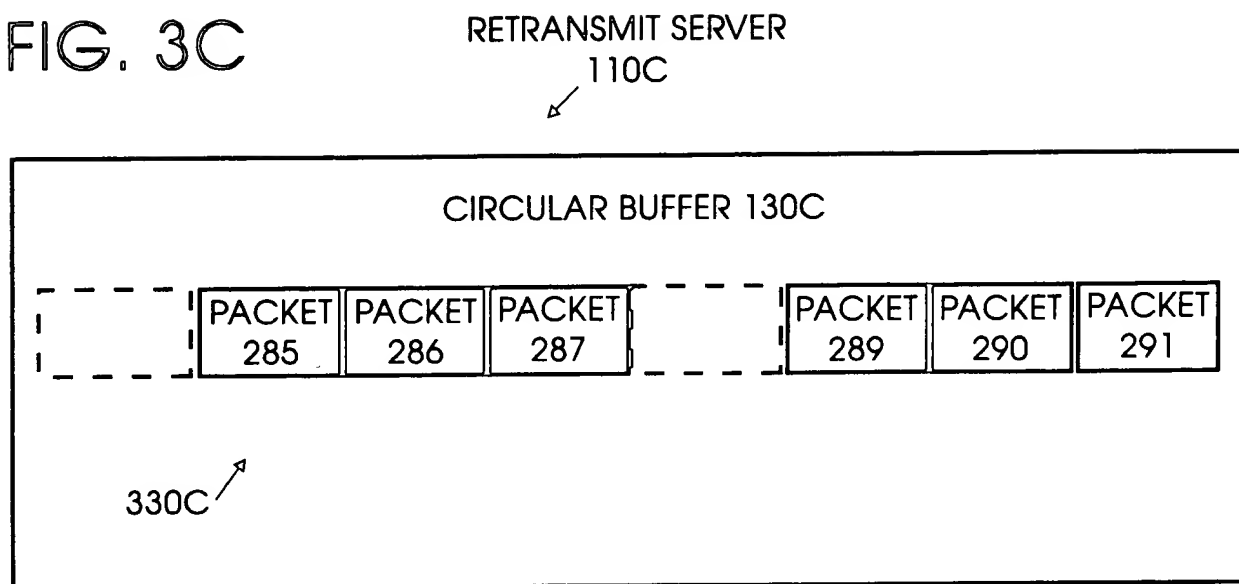


FIG. 3D

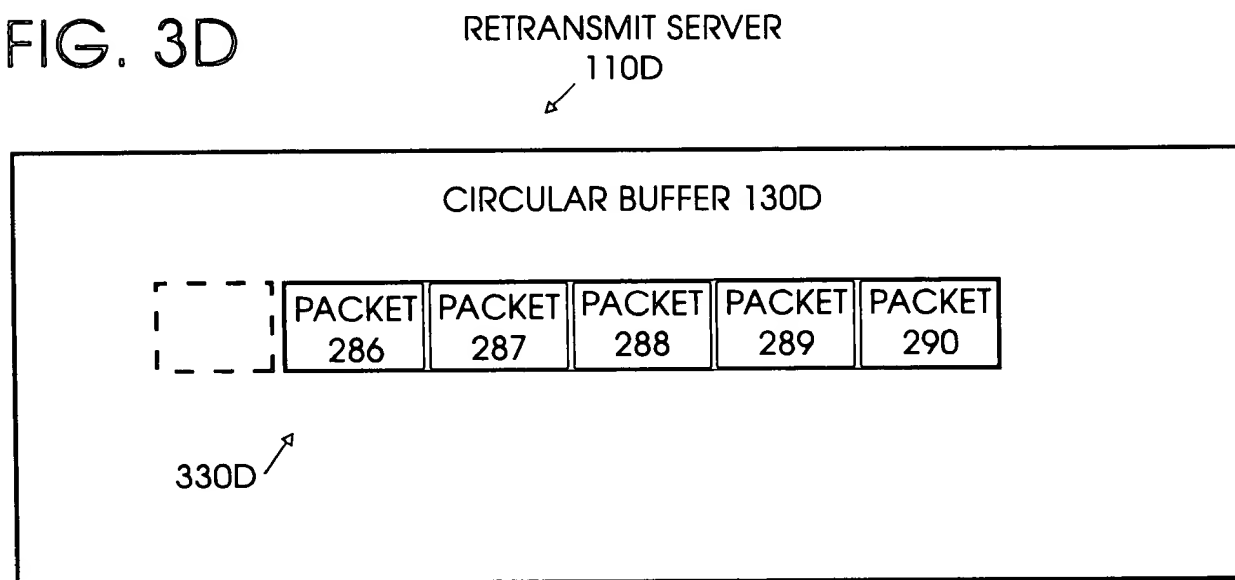
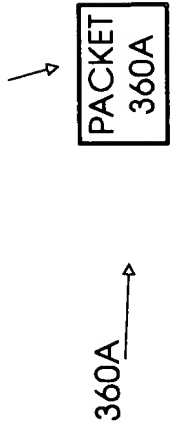




FIG. 3E

RTCP RECEIVER REPORT PACKET PERIODICALLY OUTPUT BY  
RETRANSMIT SERVER 110A

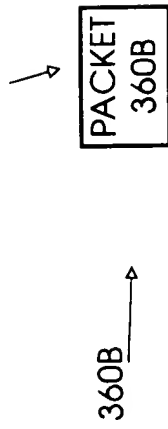


IP HEADER			UDP HEADER		RTCP RECEIVER REPORT						
SOURCE IP ADDRESS	DEST. IP ADDRESS		SOURCE PORT	DEST. PORT	ORIGINAL SENDER ID	RCVR'S ID	RCVR'S. PACKET COUNT	FRACT'N LOST	TOTAL LOST	INTER-ARRIVAL JITTER	ROUND TRIP DELAY
RETRANS. SERVER 110A	M'CAST GROUP_1 ADDRESS	...	MSG. PROC. 132A	MSG. PROC. 142	GROUP_1 SOURCE 102	RETRANS. SERVER 110A	286	286/290	4	0123	0567

PACKET 360A

# FIG. 3F

RTCP RECEIVER REPORT PACKET PERIODICALLY OUTPUT BY  
RETRANSMIT SERVER 110B

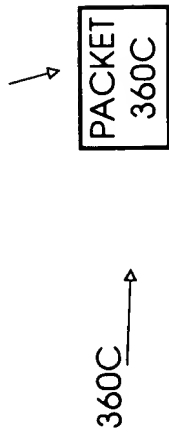


IP HEADER			UDP HEADER		RTCP RECEIVER REPORT							
	SOURCE IP ADDRESS	DEST. IP ADDRESS	SOURCE PORT	DEST. PORT		ORIGINAL SENDER ID	RCVR'S ID	RCVR'S. PACKET COUNT	FRACT'N LOST	TOTAL LOST	INTER-ARRIVAL JITTER	ROUND TRIP DELAY
...	RETRANS. SERVER 110B	M'CAST GROUP_1 ADDRESS	MSG. PROC. 132B	MSG. PROC. 142	...	GROUP_1 SOURCE 102	RETRANS. SERVER 110B	285	285/290	5	0125	0569

PACKET 360B

# FIG. 3G

RTCP RECEIVER REPORT PACKET PERIODICALLY OUTPUT BY  
RETRANSMIT SERVER 110C



IP HEADER			UDP HEADER		RTCP RECEIVER REPORT						
SOURCE IP ADDRESS	DEST. IP ADDRESS		SOURCE PORT	DEST. PORT	ORIGINAL SENDER ID	RCVR'S ID	RCVR'S. PACKET COUNT	FRACT'N LOST	TOTAL LOST	INTER-ARRIVAL JITTER	ROUND TRIP DELAY
RETRANS. SERVER 110C	M'CAST GROUP_1 ADDRESS	...	MSG. PROC. 132C	MSG. PROC. 142	GROUP_1 SOURCE 102	RETRANS. SERVER 110C	284	284/290	6	0127	0571

PACKET 360C

FIG. 3H

RTCP RECEIVER REPORT PACKET PERIODICALLY OUTPUT BY  
RETRANSMIT SERVER 110D

PACKET  
360D

360D →

IP HEADER		UDP HEADER		RTCP RECEIVER REPORT						
SOURCE IP ADDRESS	DEST. IP ADDRESS	SOURCE PORT	DEST. PORT	ORIGINAL SENDER ID	RCVR'S ID	RCVR'S. PACKET COUNT	FRACT'N LOST	TOTAL LOST	INTER- ARRIVAL JITTER	ROUND TRIP DELAY
RETRANS. SERVER 110D	M'CAST GROUP_1 ADDRESS	MSG. PROC. 132D	MSG. PROC. 142	GROUP_1 SOURCE 102	RETRANS. SERVER 110D	283	283/290	7	0129	0573

PACKET 360D